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(54) BARRIER MOVEMENT OPERATOR HAVING SERVICE REMINDERS

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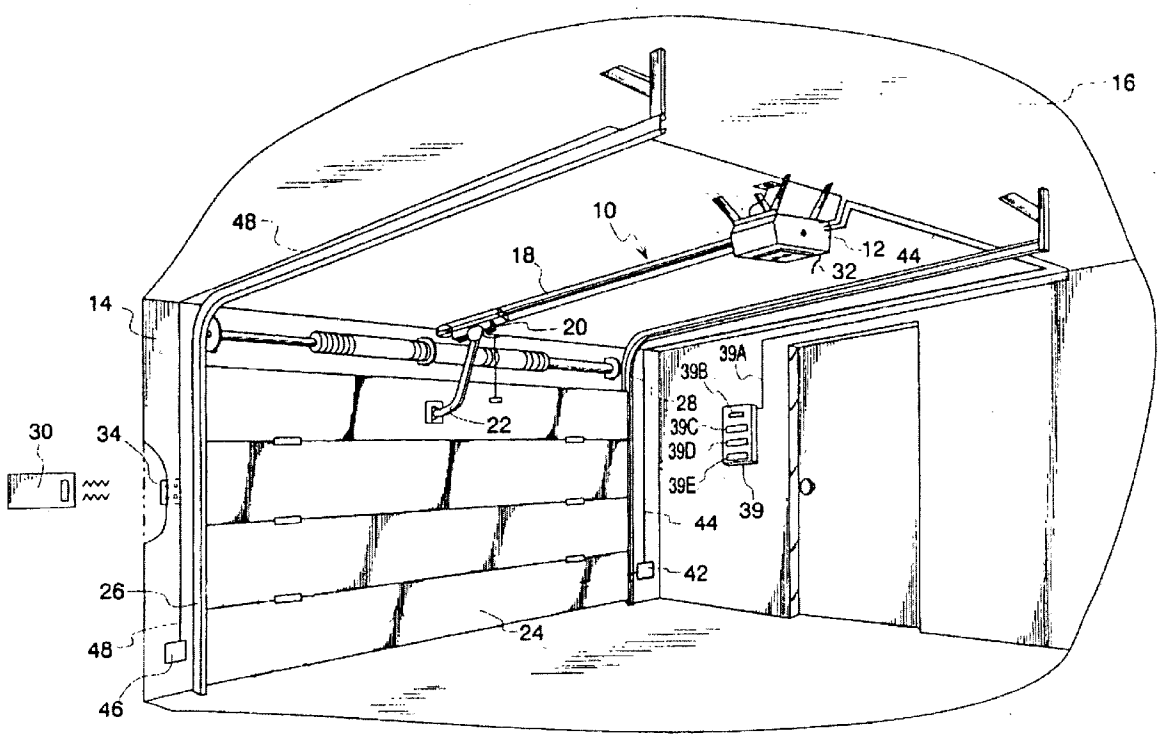
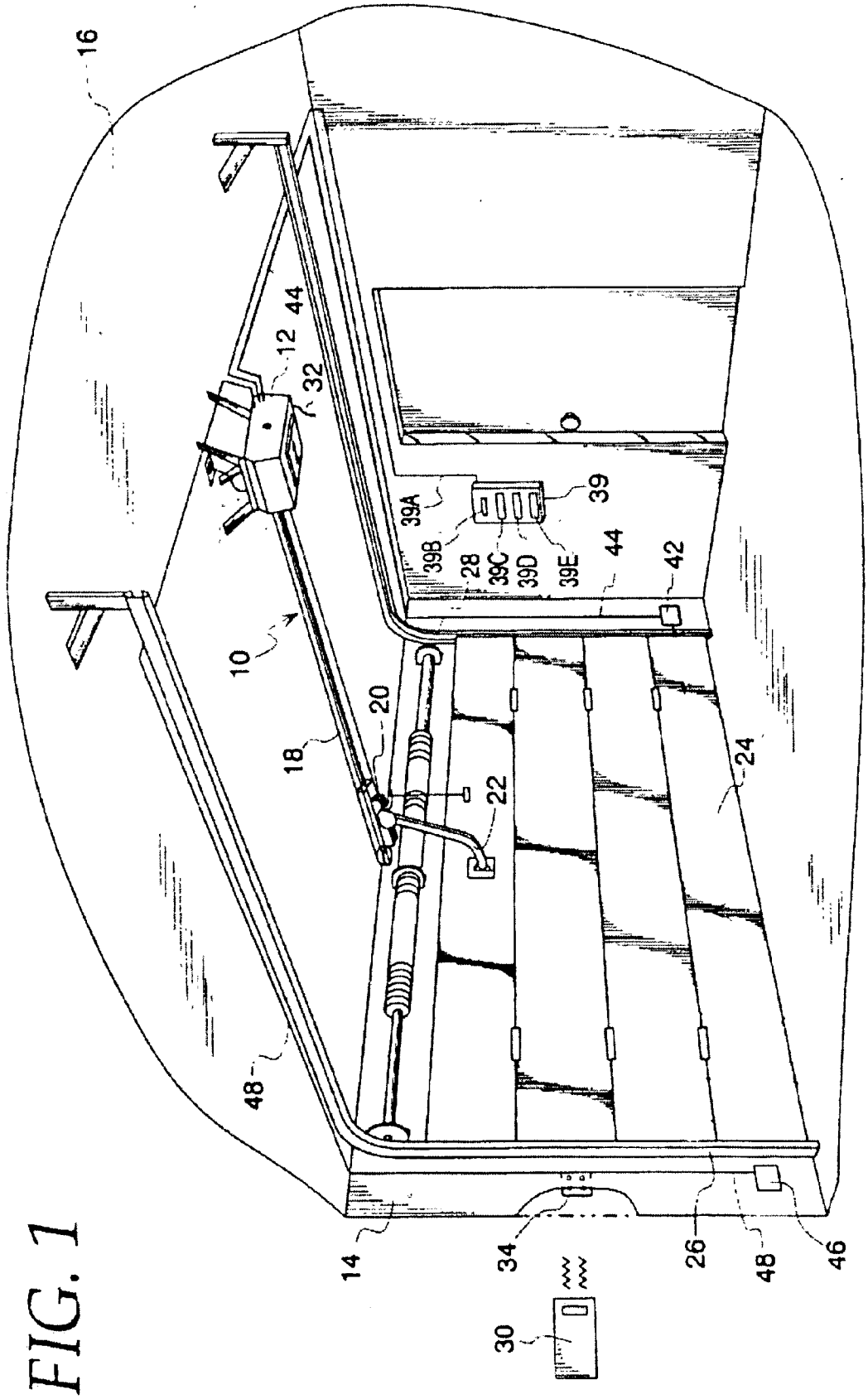
(57) **ABSTRACT**

An electronic service reminder to automatically notify a user as to when and what type of maintenance should be performed on the garage door operator, based on a variety of factors, including time, materials and operating environment. The garage door operator is configured to automatically generate an electronic service reminder in the form of an audible or visual alert based on one or more operating parameters of the garage door operator meeting or exceeding a predefined threshold. The predefined threshold is variable based on the values of the operating parameters.




16
12
44
32
39A
39B
28
39C
39D
39E
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42
10
20
18
22
24
48
14
34
26
48
46
30

FIG. 1

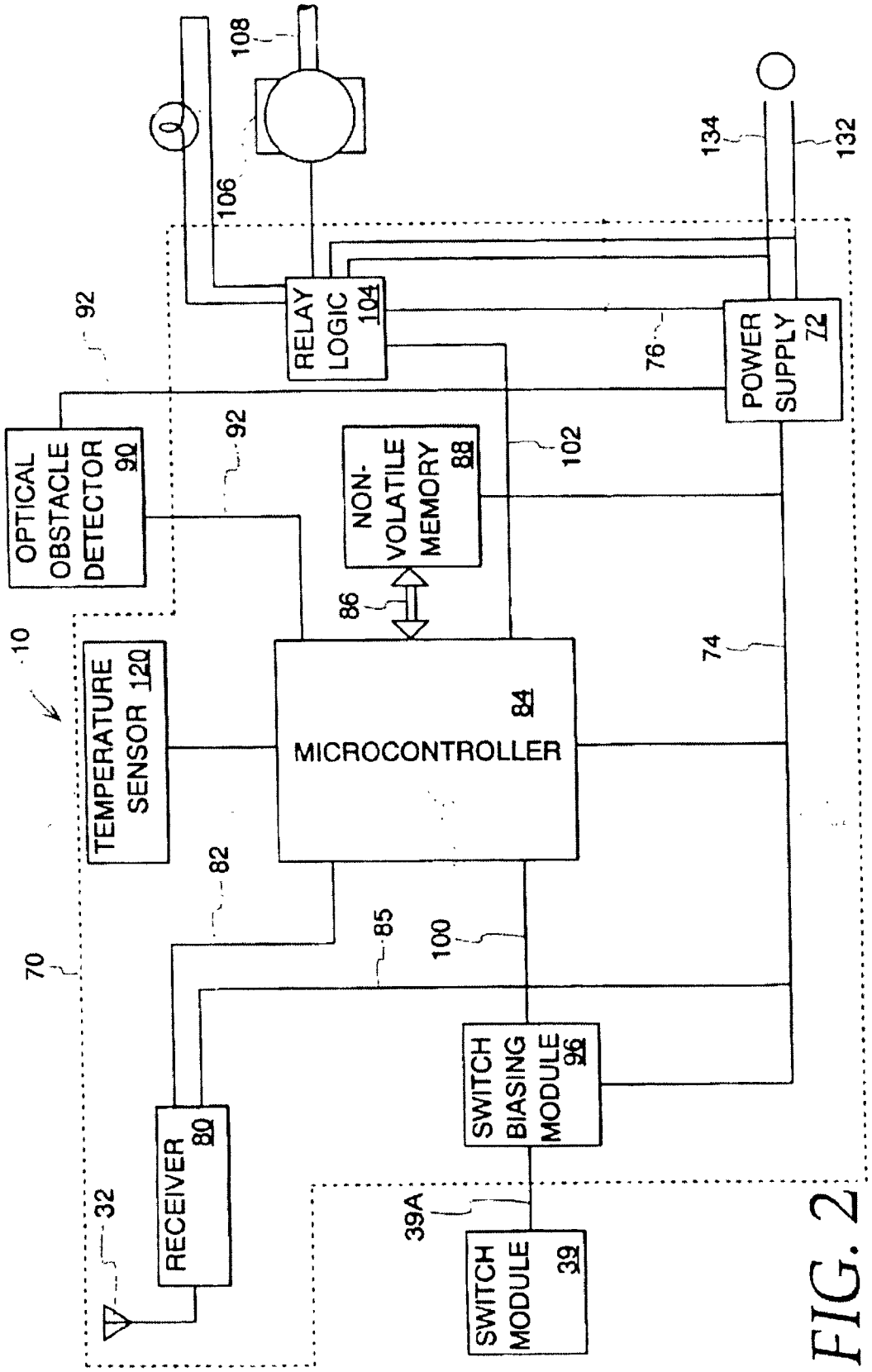
108
106
134
132
RELAY LOGIC 104
92
76
POWER SUPPLY 72
OPTICAL OBSTACLE DETECTOR 90
92
NON-VOLATILE MEMORY 88
102
86
10
TEMPERATURE SENSOR 120
MICROCONTROLLER 84
74
82
85
100
70
SWITCH BIASING MODULE 96
RECEIVER 80
32
39A
SWITCH MODULE 39

FIG. 2

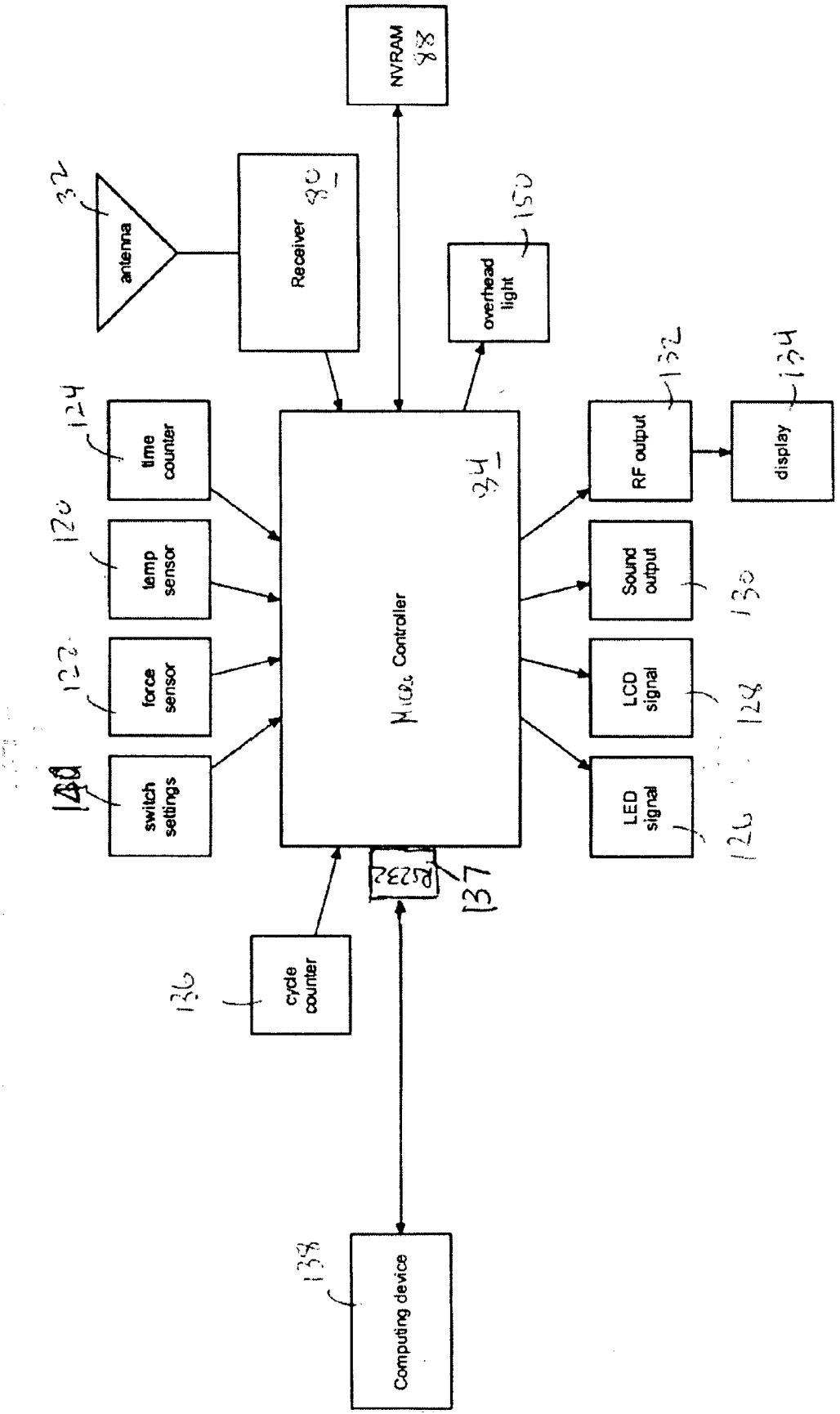
NVRAM
88
antenna
32
Receiver
90
overhead light
150
time counter
124
temp sensor
120
force sensor
122
switch settings
140
Micro Controller
94
RF output
132
display
134
Sound output
130
LCD signal
128
LED signal
126
RS232
137
cycle counter
136
Computing device
138

FIG. 3

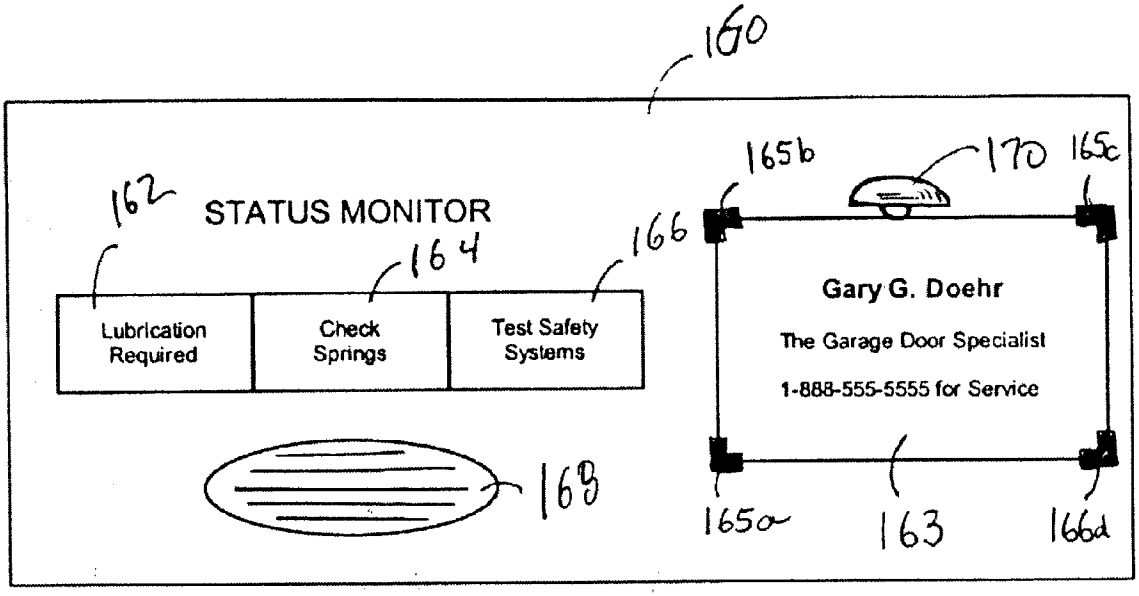

FIG. 4

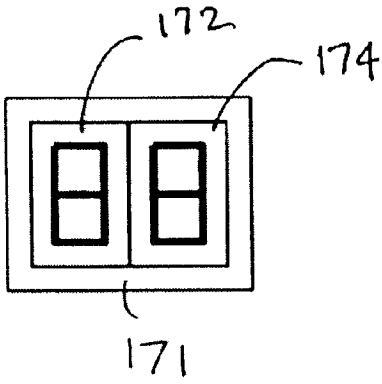

FIG. 5

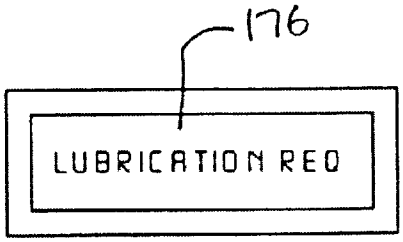

FIG. 6

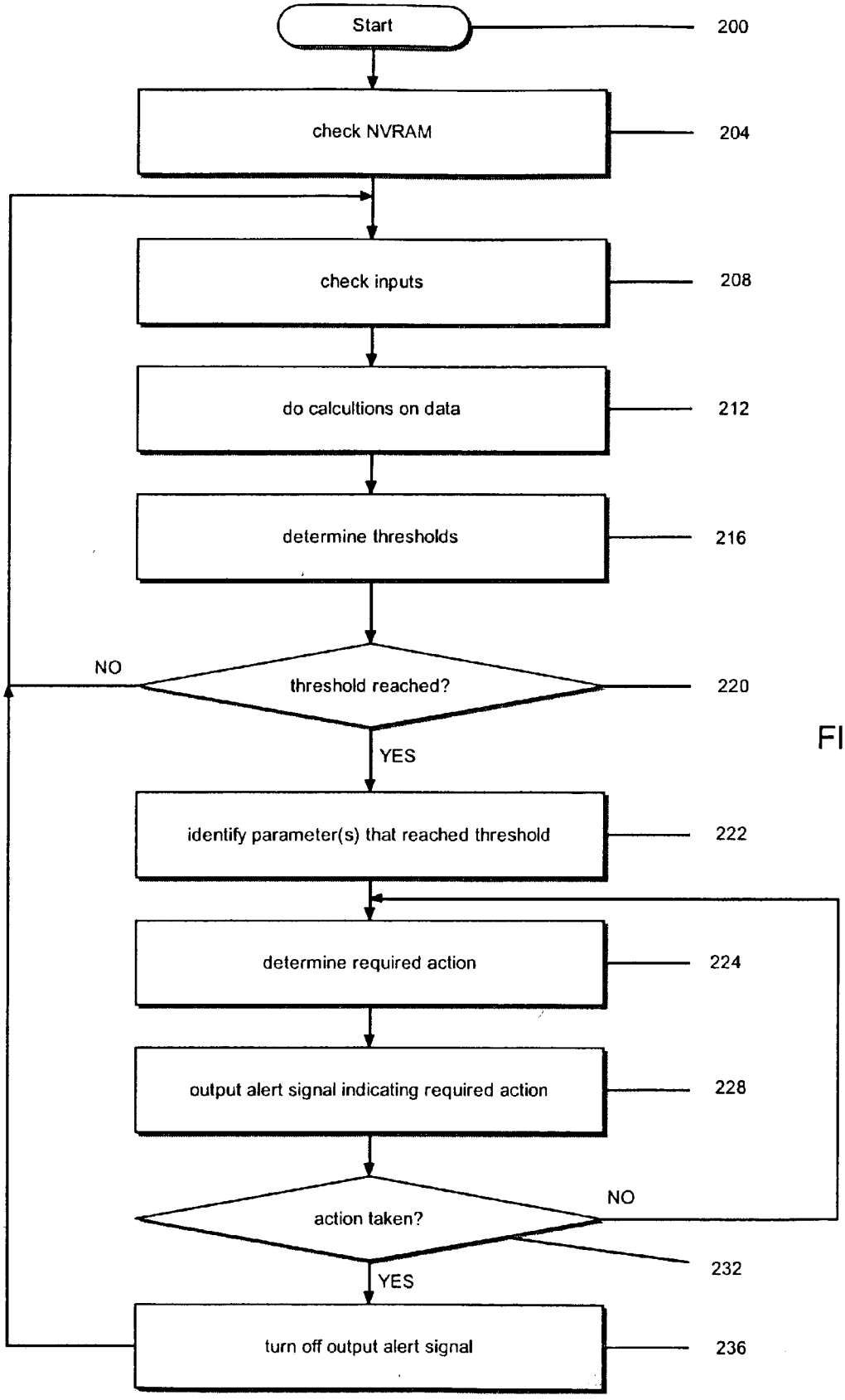
Start
200
check NVRAM
204
check inputs
208
do calcultions on data
212
determine thresholds
216
NO
threshold reached?
220
YES
identify parameter(s) that reached threshold
222
determine required action
224
output alert signal indicating required action
228
NO
action taken?
232
YES
turn off output alert signal
236

FIG. 7

BARRIER MOVEMENT OPERATOR HAVING SERVICE REMINDERS

FIELD OF THE INVENTION

[0001] The present invention relates generally to barrier movement operators and, more particularly, to service reminders indicating the need for maintenance of the barrier movement operator based on diverse operating conditions.

BACKGROUND OF THE INVENTION

[0002] Garage door operators, over the years, continue to increase in sophistication through the use of advanced electronic components and control techniques. Despite such advances, a garage door operator inherently is a mechanical device, requiring the use of motors, springs, rails and other mechanical parts to raise and lower a garage door. Typically, proper maintenance of the garage door operator requires the user to lubricate the rails of the garage door operator, check for wear of the components, such as the springs, and test the system safety devices on a periodic basis. For example, it is recommended that the feature for reversing a door in response to an obstruction be tested every month. This requires the user to open the garage door fully and place a 1½" thick piece of wood (such as a 2×4 laid flat) on the floor in the center of the door. The user then pushes the transmitter or wall button to close the door. The door should reverse when it strikes the wood. If the door does not reverse, the owner should adjust the door or the garage door operator. As such, regular maintenance of many components of the garage door operator is an important aspect of ensuring safe and proper trouble-free operation of the garage door operator.

[0003] Presently maintenance schedules, prescribing the service intervals and types of service required to keep the garage door operating properly, typically are printed in the owners manual for the users convenience. Unfortunately, manuals tend to become misplaced, discarded or ignored and their instructions forgotten. In many cases, subsequent home or business owners never are provided the opportunity of reading the owners manual before acquiring the garage door operator. As a result, maintenance schedules may not be followed over significantly long time periods, resulting in unnecessary wear and tear of the equipment and eventual premature failure.

SUMMARY OF THE INVENTION

[0004] In accordance with the present invention, there is provided an electronic service reminder to automatically notify a user as to when and what type of maintenance should be performed on the garage door operator, based on a variety of time, materials and environmental factors. For example, the garage door operator produces a notification alert based on the amount of time since the garage door operator was initially installed or since maintenance was performed on the operator previously. Other variables also are used in determining the maintenance schedule, such as the travel distance of the garage door, the life expectancy of the door and springs and the ambient temperature. Thus, the garage door operator is configured to automatically generate an electronic service reminder in the form of an audible or visual alert based on an operating parameter of the garage door operator meeting or exceeding a predefined threshold.

[0005] For example, if the garage door has been opened and closed a predefined number of times, then an alert will notify the user that the springs on the door should be checked. Advantageously, the number of usages at which the alert is provided is variable based on the type of spring being used, the distance the door travels when opening and closing or a combination of both. Other operating parameters such as ambient temperature, cycle count and travel distance also maybe used to dynamically vary the thresholds such that as each input parameter is reached, the threshold is immediately varied.

[0006] Notification that maintenance is required may take on many forms. In one form, a light or light emitting diode (LED) is activated to light or backlight a display message indicating the type of maintenance required of a user and/or to illuminate a business card of a repair or installation business. Alternatively, an LED display maybe provided to display codes corresponding to the maintenance required. Similarly, a liquid crystal display (LCD) device maybe used to display a text message precisely indicating the required maintenance. In another form, an audible tone or a series of tones is emitted to indicate that the garage door operator requires maintenance. The tone maybe audibly encoded to enable the user to determine the precise nature of the maintenance required. In still another form, a radio frequency (RF) signal is transmitted to a receiving device for generating audio or visual alerts on a remote wireless device. In an additional form, notification is provided by turning the garage door operator overhead light on and off. Thus, there is provided a garage door operator that is able to actively and automatically communicate maintenance requirements to a user relative to conventional garage door operators that require the user to refer to a printed manual for standard time schedules.

[0007] The described embodiments are directed to a movable barrier operator, such as a garage door operator, which includes a head unit housing an electric motor. The motor is adapted to drive a transmission that is connectable to the movable barrier. A wired or wireless switch, or a combination thereof, is in communication with a controller housed within the head unit for commanding the head unit to raise or lower the garage door. The controller includes a microcontroller or other processing device interfaced to a non-volatile memory (NVRAM) for storing and retrieving operator related data and other data accumulated by the controller. A receiver communication with the controller is provided for receiving radio frequency (RF) signals from the wireless switch. An overhead light, typically associated with garage door openers, is turned off and on by the controller.

[0008] The microcontroller is configured to receive and send various different kinds of data during operation. For example, the microcontroller is interfaced to a force sensor and an ambient temperature sensor for receiving input data regarding the upward and downward forces generated by the door and the ambient air temperature outside the head unit. In addition, the microcontroller receives input data from a cycle counter, time counter and a switch that is set by the user. The microcontroller also includes interfaces for providing output signal data to drive a number of different devices, such as one or more LEDs, LCDs, sound speakers and RF devices. A universal asynchronous receiver transmitter (UART) is provided as a serial communications port,

such as an EIA RS-232 port, to enable the controller to communicate with a personal computer (PC).

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings, in which:

[0010] **FIG. 1** is a perspective view of a garage door operating system in accordance with an embodiment of the invention;

[0011] **FIG. 2** is a block diagram of a controller mounted within the head unit of the garage door operator employed in the garage door operator shown in **FIG. 1**;

[0012] **FIG. 3** is a block diagram of input/output devices connected to the microcontroller within the controller shown in **FIG. 2**;

[0013] **FIG. 4** is a service reminder display unit for housing service reminder alerting devices;

[0014] **FIG. 5** is an LED display for mounting in the display unit of **FIG. 4** for displaying service reminder codes;

[0015] **FIG. 6** is an LCD display for mounting in the display unit of **FIG. 4** for displaying text based service reminder messages; and

[0016] **FIG. 7** is a flow diagram of a service reminder routine executed by the microcontroller.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Referring now to the drawings and especially to **FIG. 1**, more specifically a movable barrier door operator or garage door operator is generally shown therein and referred to by numeral **10** includes a head unit **12** mounted within a garage **14**. The head unit **12** is mounted to the ceiling of the garage **14** and includes a rail **18** extending therefrom with a releasable trolley **20** attached having an arm **22** extending to a multiple paneled garage door **24** positioned for movement along a pair of door rails **26** and **28**. The system includes a hand-held transmitter unit **30** adapted to send signals to an antenna **32** positioned on the head unit **12** and coupled to a receiver, as shown hereinafter. An external control pad **34** is positioned on the outside of the garage having a plurality of buttons thereon and communicates via radio frequency transmission with the antenna **32** of the head unit **12**. A switch module **39** is mounted on a wall of the garage. The switch module **39** is connected to the head unit by a pair of wires **39***a*. The switch module **39** includes a learn switch **39***b*, a light switch **39***c*, a lock switch **39***d* and a command switch **39***e*. An optical emitter **42** is connected via a power and signal line **44** to the head unit **12**. An optical detector **46** is connected to the head unit **12** via a wire **48**.

[0018] As shown in **FIG. 2**, the garage door operator **10**, which includes the head unit **12**, has a controller **70** that includes the antenna **32**. The controller **70** includes a power supply **72** that receives alternating current from an alternating current source, such as 110 volt AC, and converts the alternating current to +5 volts zero and 24 volts DC. The 5 volt supply is fed along a line **74** to a number of other elements in the controller **70**. The 24 volt supply is fed along the line **76** to other elements of the controller **70**. The controller **70** includes a super-regenerative receiver **80** coupled via a line **82** to supply demodulated digital signals to a microcontroller **84**. The receiver **80** is energized by a line **85** coupled to the line **74**. Signals may be received by the controller **70** at the antenna **32** and fed to the receiver **80**.

[0019] The microcontroller **84** is also coupled by a bus **86** to an NVRAM **88**, which stores set points and other customized digital data related to the operation of the control unit. An obstacle detector **90**, which comprises the emitter **42** and the infrared detector **46** is coupled via an obstacle detector bus **92** to the microcontroller **84**. The obstacle detector bus **92** includes lines **44** and **48**. The wall switch **39** is connected via the connecting wires **39***a* to a switch biasing module **96** that is powered from the 5 volt supply line **74** and supplies signals to and is controlled by the microcontroller **84** a bus **100** coupled to the microcontroller **84**. The microcontroller **84** in response to switch closures, will send signals over a relay logic line **102** to a relay logic module **104** connected to an alternating current motor **106** having a power take-off shaft **108** coupled to the transmission **18** of the garage door operator.

[0020] As further shown in **FIG. 3**, the microcontroller **84** also is coupled to a number of input devices for receiving external data. These devices include a time counter **124**, a temperature sensor **120**, a force sensor **122**, a cycle counter **136** and a switch **140**. The time counter **124** is a real time clock (RTC), such as the Dallas Semiconductor DS1307, for measuring elapsed time. Alternatively, a simple oscillator maybe used instead to generate pulses that are counted by the microcontroller **84** to determine elapsed time or the microcontroller **84** can count its own internal clock. The cycle counter **136** counts the number of opening and closing operations that the garage door operator **10** executes.

[0021] The temperature sensor **120**, which may be any commonly available temperature sensor such as the National Semiconductor LM75, is placed outside the head unit to measure the ambient temperature of the atmosphere surrounding the garage door operator **10**. The microcontroller **84** is able to query the temperature sensor **120** as needed to obtain the ambient temperature in which the garage door operator is operating. The force sensor **122** measures the force required to move the door. This force is an indication all the level of fatigue of the springs. As with the time counter **124**, the force sensor **122** maybe a software function of the microcontroller **84**.

[0022] The results from the input devices are used in a number of ways to determine when and what type of alert is to be generated. For example, the measured elapsed time is used for generating an alert every thirty days to notify a user to perform an obstruction test. In another example, the measured elapsed time is used in conjunction with the number of counted cycles to generate an alert every six months or 1000 cycles of operating cycles, whichever comes first.

[0023] A communications port **137**, such as an RS232, universal serial bus (USB) or IEEE1394 (typically referred to as a firewire port) or any other communications interface is provided to enable the microcontroller **84** to communicate with an external computing device **138**, such as a personal, laptop or handheld computer. In one mode, data that is read from or written to the NVRAM **88** is output on the com-

munications port **137** to enable a user to view the data being transferred into and out of the system using an attached computing device.

[**0024**] The switch **140** is used to specify to the microcontroller **84** various parameters relating to service intervals such as the type of spring being used in the system. A dual inline package (DIP) switch having one or more switch levers maybe used, although any similar type of switch is also acceptable. Based on the position of the switch levers, the microcontroller **84** is able to determine thresholds for identifying a need for service. The microcontroller **84** cross-references the switch settings with the particular characteristics of the installed spring, which are stored in the NVRAM **88**. Spring characteristics may include information relating to the predicted lifespan of the spring, optimum operating parameters and spring constant, among others. For example, the switch settings are used to identify whether the spring is a five thousand, ten thousand or fifty thousand cycle spring.

[**0025**] Additional levers on the switch **140**, or even another switch (not shown), also are provided to specify to the microcontroller **84** the type or weight of the garage door that the garage door operator **10** is lifting and lowering. The switch settings include preprogrammed positions for indicating within what range of weights the garage door falls.

[**0026**] By determining the number of counted operating cycles, the measured forces on the spring and the measured elapsed time, the threshold at which an alert is generated is determined. For example, if the forces on the garage door show that the springs are no longer counter balancing the total weight of the door, and the door is now 50 pounds heavier, then the spring/cycle threshold is shortened and an alert is generated after a relatively fewer number of operating cycles. The converse is true as well. Thus, advantageously, by having a precisely tailored maintenance regimen, the life of the springs is extended.

[**0027**] The microcontroller **84** also provides several output ports that the garage door operator **10** uses to produce signals alerting users that maintenance of the garage door operator **10** maybe necessary. The microcontroller **84** provides an LED output signal **126** for driving an LED (not shown) or an LED display **172**, **174** (**FIG. 4**). Alternatively, or in addition to the LED output signal **126**, the microcontroller **84** provides an LCD signal **128** for enabling text-based messages to be displayed on an LCD **176** (**FIG. 4**). A sound output **130** generates signals for driving a speaker, preferably placed behind a protective speaker grill **168** (**FIG. 4**). The sound output signal **130** maybe modulated so that a user is able to determine the type of maintenance that is required by simply listening to the sound coming from the speaker. In addition, an RF transmitter **132** is provided as well to enable wireless messages to be sent to an RF signal-receiving device for enabling alerts from the microcontroller **84** to be transmitted to a remote wireless device (not shown) or to the display unit **160** (**FIG. 4**). The RF transmitter **132** also maybe configured as a transceiver device that is capable of receiving and transmitting RF commands from a remote source (not shown) or from the display unit **160**.

[**0028**] Referring to **FIG. 4**, several exemplary embodiments of the service reminder are shown. The display unit **160** is configured as a housing unit into which the service reminder alerts are mounted. As shown by way of example only, since other messages in various other configurations are also possible, the display unit **60** includes several reminder message panels, including "Lubrication Required"**162**, "Check Springs"**164** and "Test Safety Systems"**166**. The message panels **162**, **164**, **166** are constructed of a light weight plastic or glass material of a predetermined color, such as red or orange. The messages themselves are printed using a white glass or plastic material. The display unit **160** is configured with a recess (not shown) into which an LED in communication with the microcontroller **84** via the LED signal **126** is fitted. The LED is fitted into the recess such that when the message panel **162** is affixed to the display unit **160**, the LED is completely covered by the message panel **162**. Thus, when the LED receives the LED signal **126** and turns on, the message panel **162** will display brightly a service reminder message indicating the type of service required. Each message panel is configured similarly, such that depending on the LED being illuminated, the appropriate panel and message is illuminated.

[**0029**] A speaker connected to the sound output **130** of the microcontroller **84** for sounding an audible alert message is mounted behind a protective grill **168** on the display unit **160**. Thus, a user who may not notice the activation of LEDs, will also be provided with an alert tone when the microcontroller **84** generates a sound output signal. If the alert tone is coded, then the user is able to decode the coded tones to determine the service required on the garage door operator **10**. Alternatively, a tone from the speaker **168** will alert the user to the fact that the display unit **160** needs to be examined for pending service reminder messages. Alternatively the sounds from the speaker can be modulated to create speech.

[**0030**] An additional feature that is provided is a holder for a business card **163** or note paper indicating a telephone number of a garage door operator service technician or the like. The card **163** is held in place by four corner-holders **165***a*, **165***b*, **165***c*, **165***d* underneath a lighting device **170**, such as a small incandescent light bulb or white LED. Alternatively, a lighting device (not shown) is mounted behind the business card **163** to illuminate the business card **163** from the reverse side, such that the business card **163** lights up when the lighting device is turned on. The lighting device in the alternate configuration is, like the LEDs, inserted into a recess such that the business card **163** is able to sit flush against the base unit.

[**0031**] Referring to **FIG. 5**, an LED display **171** is shown comprising two seven-segment displays **172**, **174**. In an alternate embodiment, the LED display **171** is installed in place of the message panels **162**, **164**, **166** (**FIG. 4**). As such, when an LED signal **126** from the microcontroller **84** (**FIG. 3**) is generated, the LED display **171** will output a alpha-numeric code representative of the maintenance required by the garage door operator **10**. The user is then able to cross reference the code to a user manual or a chart that maybe located near the display unit **160**.

[**0032**] Referring to **FIG. 6**, an LCD display **176** is shown wherein in an alternate embodiment the LCD display **176** is installed into the display unit instead of either the LED display **171** or the message panels **162**, **164**, **166**. A particular advantage of the LCD display **176** is its ability to display text-based messages. In particular, the microcontroller **84**

(**FIG. 3**) produces an LCD signal that enables a variety of specific messages to be displayed on the LCD display **176** to explicitly indicate to the user the service that needs to be performed on the garage door operator. In another aspect, the microcontroller **84** is programmed to generate an LCD display signal that scrolls across the face of the display, thereby enabling short messages to appear. Such messages may include specific operating parameter information or the name and number of a preferred service provider.

[**0033**] Referring to FIGS. **4-6**, in the foregoing discussion it was shown that the alerting devices mounted on the display unit **160** are connected to their respective signaling lines from the microcontroller **84**. It is to be noted that the connection is accomplished in one of many ways, including wired, wireless or a combination of both. In a particular embodiment, the display unit **160** includes a mounted RF transceiver (not shown) for receiving and transmitting signals to an RF transceiver in the controller **70**. Preferably, short-range wireless signals are used, such as Bluetooth, for communicating between the transceivers. However, other RF signaling protocols also maybe used including one-way communications methods.

[**0034**] Referring to **FIG. 7**, the garage door operator is shown in operation. Upon initial power-on in step **200** the microcontroller checks the NVRAM in step **204** to determine whether any existing operating data is stored. A checksum validation also maybe performed to ensure that the data is valid, particularly if the system is being activated for the first time. The microcontroller then begins receiving input from the sensors, including the force sensor, temperature sensor and time counter in step **208**. More particularly, the system enters a monitoring mode of operation where the microcontroller accumulates operating data from the various input sensors as the garage door operator is used. The data from the sensors includes the ambient temperature in which the garage door operator is operating, a running total of the number of times the door has been lifted and closed and the force difference between opening and closing of the door.

[**0035**] Based on the input data parameters from the various sensors, the microcontroller calculates in step **212** initial threshold values based on a function of the present and past data received by the sensors. In another aspect, the system is configured with an additional variable that is used to accrue variations in the input parameters and the threshold is based on this mathematical variable.

[**0036**] The threshold values are a result of the calculations performed on the input data and are variable depending on the change in the data values. For example, if the ambient temperature experiences a decrease, then the spring life may be extended by a certain time period. As such, the service reminder to check the springs may be delayed by an amount of time beyond that recommended in the owners manual. Similarly, if the ambient temperature experiences an increase, lubrication may be required at a time slightly earlier than recommended in the manual. Threshold determination is dynamic and variable in that the threshold values may change immediately as data is read from the sensors and varies based on the values of the inputs received by the sensors. If the threshold values are met or exceeded, an alert is generated. The threshold values are then set in step **216**. That is, the microcontroller will generate a signal on at least one of the alert outputs if a threshold value is met or exceeded as determined in step **220**.

[**0037**] In step **220**, the microcontroller determines whether any of the threshold values determined in step **216** has been met or exceeded. If no threshold value has been met or exceeded in step **220**, the microcontroller returns to step **208** and continues collecting operating data. However, if a threshold value has been reached or exceeded during operation of the garage door operator, in step **222** the particular parameter or parameters that reached the threshold limit is identified. Based on the identity of the parameters and the algorithm used in determining threshold values the particular type of maintenance required is determined in step **224**. In step **228** an output alert signal is generated by the microcontroller to illuminate the proper LED/message panel or display the appropriate LCD text message and sound the appropriate tones.

[**0038**] Subsequent to the service reminder alert being generated, the system in step **232** determines whether any action has been taken in response to the reminder message sufficient to disable the output alert signal. Several valid responses are available. First, a test of the safety system maybe conducted that includes reversal of the garage door due to a force obstruction to confirm that the safety system has been tested. Alternatively, the system may turn off the alert based on a period of elapsed time or number of operations of the garage door operator lifting and lowering the garage door. Additional valid responses include one or more operations from the wall or keyless entry controls, a power on reset or even any specific command input as determined by the user. Accordingly, if any of the enumerated responses are received, the microcontroller will turn off the outputs in step **236** and continue accumulating operating data in step **208**.

[**0039**] While the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications, and variations as fall within the spirit and broad scope of the appended claims.

What is claimed is:

1. A movable barrier operator for opening and closing a barrier, comprising:

a controller for accumulating operating data relating to operation of the movable barrier operator, the operating data including information representative of one or more categories of barrier operator operating parameters;

a counter for measuring elapsed time;

a sensor for measuring ambient temperature; and

an alert state based on a result of a function of the elapsed time, ambient temperature and the operating data having reached a predefined threshold.

2. The movable barrier operator of claim 1, wherein the predefined threshold is dynamically variable based on the measured ambient temperature.

3 The movable barrier operator of claim 1, wherein the predefined threshold is dynamically variable based on the long-term average of the temperature.

4. The movable barrier operator of claim 1, wherein the alert indicates that the barrier operator requires or soon will require service.

5. The movable barrier operator of claim 4, wherein the alert is a visual indicator comprising an LED configured to turn off and on.

6. The movable barrier operator of claim 4, wherein the alert comprises an LCD configured to display the existence of an alert condition and to display information regarding the required service.

7. The movable barrier operator of claim 4, wherein the alert comprises a coded audible sound signal.

8. The movable barrier operator of claim 1, wherein the alert state is based on a result of an accumulation function of the elapsed time, ambient temperature and the operating data having reached a predefined threshold.

9. A movable barrier operator for opening and closing a barrier, comprising:

a controller for accumulating operating data relating to operation of the movable barrier operator, the operating data including information representative of one or more categories of barrier operator operating parameters;

a counter for measuring elapsed time;

a sensor for measuring a representation of the force required to open and close the barrier; and

an alert state based on a result of a function of the elapsed time, the measured force and the operating data having reached a predefined threshold.

10. The movable barrier operator of claim 9, wherein the alert indicates that the barrier operator requires testing to determine whether the barrier operator is operating in its prescribed manner.

11. The movable barrier operator of claim 9, wherein the alert is a visual indicator comprising an LED configured to turn off and on.

12. The movable barrier operator of claim 9, wherein the alert comprises an LCD configured to display the existence of an alert condition and to display information relating to the alert condition.

13. The movable barrier operator of claim 9, wherein the alert comprises a coded audible sound signal.

14. The movable barrier operator of claim 9, wherein the alert state is based on a result of an accumulation function of the elapsed time, measured force and the operating data having reached a predefined threshold.

15. A movable barrier operator for opening and closing a barrier, comprising:

a controller for accumulating operating data relating to operation of the movable barrier operator, the operating data including information representative of a number of opening and closing cycles of the barrier;

a spring having an identifiable type for assisting the movable barrier operator in moving the barrier between an opened and closed position; and

an alert state responsive to operating data indicating that the number of opening and closing cycles having reached a predefined threshold representative of spring type.

16. The movable barrier operator of claim 15, further comprising a counter for determining a number of operations executed by the movable barrier operator representative of a count of opened and closed cycles executed by the movable barrier operator, wherein the alert is activated based on a result of a function of the number of cycles having executed, operating data and the spring type having reached a predefined threshold.

17. The movable barrier operator of claim 16, further comprising a user controlled input device for indicating the type of spring assisting the barrier.

18. The movable barrier operator of claim 15, wherein the alert indicates that the spring requires service.

19. The movable barrier operator of claim 18, wherein the alert is a visual indicator comprising an LED configured to turn off and on.

20. The movable barrier operator of claim 18, wherein the alert comprises an LCD configured to display the existence of an alert condition and to display information regarding the required service.

21. The movable barrier operator of claim 18, wherein the alert comprises a coded audible sound signal indicating that one or more of the operating parameters has reached a predetermined threshold.

22. The movable barrier operator of claim 15, wherein the alert is activated based on the number of cycles having executed.

23. The movable barrier operator of claim 15, wherein the alert is activated based on a result of a function of distance traveled by the barrier between opening and closing.

24. The movable barrier operator of claim 15, wherein the value of the threshold varies based on the operating data received by the controller.

25. The movable barrier operator of claim 18, wherein the value of the threshold varies based on the operating data received by the controller.

26. The movable barrier operator of claim 18, wherein the alert state is based on a result of an accumulation function of the number of opening and closing cycles having reached a predefined threshold.

27. A movable barrier operator for opening and closing a barrier, comprising:

a controller for accumulating operating data relating to operation of the movable barrier operator, the operating data including information representative of one or more categories of barrier operator operating parameters;

a spring for assisting the movable barrier operator in moving the barrier between an opened and closed position;

a counter for measuring elapsed time;

a sensor for measuring ambient temperature;

a sensor for measuring a force required to open and close the barrier;

an alert state based on a result of a function of the elapsed time and sensor data having reached a predefined dynamically variable threshold.

28. The movable barrier operator of claim 27, further comprising an alarm responsive to the alert state for indicating that the movable barrier operator requires servicing.

29. The movable barrier operator of claim 27 wherein the alarm is disabled through a predefined action by a user.

30. The movable barrier operator of claim 27, wherein the alarm is a visual indicator.

31. The movable barrier operator of claim 28, wherein the alarm is an aural indicator.

32. The movable barrier operator of claim 31, wherein the visual indicator displays a text message.

33. The movable barrier operator of claim 28, wherein the alarm is configured to communicate wirelessly with the controller.

34. The movable barrier operator of claim 27, wherein the alert state is based on a result of an accumulation function of the elapsed time and sensor data having reached a predefined dynamically variable threshold.

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